

Lawrence Livermore National Laboratory

Effective:

Operational Safety Plan No. \_\_\_\_\_

Expires:

Review level: \_\_\_\_\_ [A, B, or C—see Appendix C]

Page # of #

*Title of the Operation or Experimental Activity*

*In the following sections replace editorial instructions (provided in italics) with your own text Summarize information in a few words.*

Responsible Individual: *Name and extension*

As identified by the Authorizing Organization. Alternate Responsible Individual: *name and extension*

*Authorizing Organization: As defined in "Laboratory and ES&H Policies, General Worker Responsibilities, and Integrated Safety Management" Appendix A, (H&SM C1) in Volume I of the ES&H Manual.*

*Location(s): List building and room(s) and add additional details or description in Section 3.2 below, if needed.*

## 1.0 Reason for Issue

*Explain the reason(s) for issuing the OSP. In general, OSPs and their supplements are issued for the following reasons:*

- *An OSP is required by provisions of the technical documents of the ES&H Manual as summarized in H&SM C2, Appendix 2-E.*
- *The work entails hazards and controls not covered in the applicable FSP.*
- *The IWS screening has determined the work involves activities that are not commonly performed by the public and is not covered by an FSP or by direct reference to provisions of the ES&H Manual.*
- *An OSP is mandated by management.*
- *The work takes place off site (i.e., at a location other than the LLNL main site, Site 300, or Nevada Test Site), LLNL personnel have operating responsibility, and the work involves activities not commonly performed by the public.*

Here are examples of "Reason for Issue" statements:

*The ES&H Manual requires a safety plan for operations that involve the use of fissile materials (e.g., ~1 kg of  $^{235}\text{U}$ ).*

*Operations with short-pulse lasers and laser dyes will be performed. The controls necessary for safe operations are not covered in the ES&H Manual.*

*The FSP limits operations to Class I and II lasers and requires an OSP for Class III or IV lasers. This operation involves the use of a Class IV laser.*

## 2.0 Responsibilities

*Name of the Responsible Individual and his/her extension* is responsible for ensuring the safety of this operation and for ensuring that all work is performed in conformance with this OSP, the FSP, and applicable sections of the *ES&H Manual*. In the absence of [*Name of the Responsible Individual*], [*name of the alternate Responsible individual and his/her extension*] shall assume these responsibilities. [*Name of the Authorizing Organization*] is the Authorizing Organization and is responsible for managing the covered work activities.

## 3.0 Scope of Work

### 3.1 Work to be Done

*Describe the work to be done that is to be covered by this plan. A good work description is critical to the identification of hazards and the identification of appropriately tailored controls. Use the instructions.*

- *Use the graded approach. Describe in detail the physical activities for which the OSP must be written (e.g., those activities not adequately covered in the FSP or ES&H Manual.) Less hazardous work can be discussed with less detail.*
- *When the scope of work is not well defined or may change, put boundaries on the type of work that will be performed (e.g., categorize with limits). Use examples of current work being performed.*
- *State what is to be done but not how the work will be done.*
- *If appropriate, include work associated with construction, set-up, and dismantlement phases of the operation, or consider attaching separate documentation (e.g., an IWS).*

### 3.2 Location of the Activity

*This section is optional if the location description at the beginning of the OSP is sufficient. Otherwise,*

- *Use this section to describe details or uncertainties of work locations. Use building and room number(s), if appropriate.*
- *Identify the location(s) of the work and the storage of any hazardous materials.*
- *If the operation is outside a building or is located off site, describe the general location.*

## 4.0 Hazards Analyses and Controls

*This section of a standard OSP shall discuss a specific hazard category or environmental concern, followed by a discussion of the needed and directly related controls. Other format modifications may be needed to best communicate the hazards and controls of a specific operation or group of operations, but the controls must be linked to the hazards and/or work.*

*Note: Existing OSPs formatted with separate sections for hazards and controls may be used until the next complete re-write of the OSP. Also, apply the instructions in Section 3.1 (above) to the discussion of hazards and controls.*

### 4.1 Hazards Analysis

*This subsection shall identify significant hazards and their potential consequences, including hazardous materials, hazardous agents, hazardous energies, and environmental concerns associated with the work to be done as presented in Section 3.1. Be as specific as possible when describing the hazards and quantifying the operating parameters for the work that requires an OSP. Use the graded approach (as discussed in Section 3.1) to analyze other hazards. For examples, refer to the LLNL [Integration Work Sheet list of hazards](#).*

*The hazards should be presented in order of significance. For example, if the OSP is required because it involves a class IV laser, then lasers should be the first hazard in this section.*

*In addition,*

- *Identify the hazards and environmental concerns associated with each aspect of the operation, including the potential consequence(s).*
- *Discuss both the worst-case and likely accident scenarios, as appropriate. Answer the following question to determine the worst-case: "If this operation were conducted without any controls, what might be the consequences?"*

- *Provide or refer to a list of hazardous and/or radioactive materials, including the quantities both in use and in storage, and the storage location(s).*

*When appropriate, key safety limits should be discussed, such as*

- *Limits established to keep the operations within the facility or operational safety envelope or to retain compatibility with other nearby operations.*
- *Occupational exposure limits (e.g., Permissible Exposure Limits and Threshold Limit Values). Occupational exposure limits should be compared to conclusions from monitoring data or from estimates of exposure potential made by competent ES&H subject matter experts.*
- *Hazardous energy limits, such as temperature, pressure, and voltage.*

*Contact your ES&H Team for assistance with stating the potential consequences of each identified hazard.*

## 4.2 Controls

*As shown in the following example, this section shall discuss the significant controls needed and required to mitigate the hazards and ensure a safe work activity. Controls may include engineering, administrative, and personal protective equipment. Use engineering controls when needed and preferentially. When adequate, controls for the hazards that are contained in the ES&H Manual may be referenced rather than duplicated.*

### *X-ray Machine Hazards*

*4.1.1 The x-ray machine has a tungsten target and will be operated at a maximum of 30 kV and 30 mA. The primary beam produces on the order of 2000 R/min at 10 cm from the tube. The primary beam is completely contained and impinges on a secondary target of yttrium. It is estimated that the exposure rate from the open-beam, 15-kV, fluorescent x-rays entering the glove box is about 20 R/min (1200 R/h). The limit for hand exposure is 50 rem/y; therefore, an overexposure could occur with a 2.5-min exposure of the hands.*

### *X-ray Machine Controls*

*4.1.1 The applicable controls for x-ray devices contained in "LLNL Radiological Safety Program for Radiation-Generating Devices" (H&SM S33.47) in Volume II of the ES&H Manual shall be followed.*

*4.1.2 The secondary x-ray beam shall be enclosed in an interlocked glove box. Interlocks shall be tested semiannually by the electronics technician supporting the operation.*

*4.1.3 The health and safety technician shall perform an x-ray survey when the machine is energized for the first time and annually thereafter. If the dose rates exceed 2.5 mrem/h outside the glove box, the health physicist shall be notified.*

*Additional specific instructions include:*

- *Be specific in describing each control.*
- *Provide both action and reaction, if appropriate. For example, if a control for contamination is to "survey the area at the completion of the job," state what to do if contamination is found.*
- *Personal protective equipment required for specific work, including the minimum acceptable personal protective equipment (e.g., materials for chemical gloves) shall be discussed.*
- *If an Engineering Safety Note has been prepared (e.g., for high-pressure apparatus), include a summary of the design parameters that established the system's limitations and list the safety note in the reference section and submit a copy of the Engineering Safety Note with the OSP for review. Keep a copy of the Engineering Safety Note in the work area.*
- *For hazardous and/or radioactive materials, describe the required controls for shipping, receiving, storing, and using these materials.*
- *Reference any applicable safety procedures. (See "Preparation of Work Procedures" (H&SM S2.01) in Volume I of the ES&H Manual.)*

*Contact your ES&H Team for assistance with developing adequate controls for each identified hazard.*

## 5.0 Training and Required Reading

*Only training requirements applicable to the hazards discussed in the OSP are to be presented. To determine these requirements, consult*

- *The training program plan(s) for the responsible directorate(s).*
- *["LLNL Training Program Manual"](#) in Volume IV of the ES&H Manual.*
- *Livermore Training Records And Information Network (LTRAIN) website.*

## 6.0 Maintenance, Inspections, and Quality Assurance

*If maintenance, inspections, or quality assurance activities are necessary to maintaining the required controls, this section shall be added to discuss or reference the following:*

- *Identify the safety systems associated with the operation for which failure to provide preventive maintenance could significantly increase the risk of injury, illness, loss or damage of property (including programmatic equipment), or impact on the*

environment. Examples include interlocks, alarms on temperature sensors, hoods and filters, or scrubbers used in chemical operations.

- Specify the required maintenance to ensure these protective systems continue to function as designed, and identify the person responsible for conducting the maintenance. Additional guidance is provided in Section 4 of the LLNL Maintenance Program Guidance Manual. Refer to existing maintenance plans and programs where they exist.
- For the components and systems identified in Section 4 of the OSP as being critical to ES&H, state the methods for ensuring the quality of these systems (i.e., the schedule of tests, surveys, and inspections that will be performed on components or systems important to safety and environmental protection). Refer to existing, relevant quality assurance plans and procedures or to applicable sections of the FSP. Refer to the "[LLNL Quality Assurance Program](#)" in Volume IV of the ES&H Manual for additional guidance.

## 7.0 Emergency Response Plans and Procedures

*If special actions need to be taken in the event of abnormal situations or accidents unique to this operation (e.g., spill of hazardous or radioactive material) this section shall describe the appropriate response procedures). If emergency procedures are provided in the FSP and are applicable to the operation, it is sufficient to simply provide a reference to the relevant FSP section.*

*If the needed emergency response is unique to the operation and preplanned actions must be taken by other groups (e.g., Fire Department, Health Services, Hazards Control, Environmental Protection, or Plant Engineering), discuss these preplanned actions.*

*For operations and processes with significant adverse ES&H impacts, a "safe shutdown plan or procedure" shall be developed and posted in appropriate locations (e.g., in control rooms for accelerators, at radiation-producing machines, and at explosives processing and firing facilities). Safe shutdown procedures may also be required for high-voltage equipment or chemical operations involving significant quantities of toxic or radioactive materials to mitigate serious health risks to operating personnel, other Laboratory employees, and the public. These procedures shall be accessible to emergency response personnel for all operations that may be left unattended.*

## 8.0 References

*List the FSP, applicable Engineering Safety Notes, operating procedures, Safety Analysis Reports, Safety Analysis Documents, etc.*

## 9.0 Review and Approval

*Use the following statement, if applicable:*

*"This operation is consistent with technical safety requirements or operational safety requirements (as appropriate). It also meets the specified safety limits and limiting conditions of operations in the safety analysis [Screening Report, HAR, SAD, SAR] for building [building number and name of facility], dated [specify issue date]."*

*The list of signatures to an OSP should be limited to the*

- *Responsible Individual.*
- *An appointed representative of the Facility AD responsible for the area where the activity will occur.*
- *The Authorizing Individual as identified by the Authorizing Organization, consistent with the ES&H Manual.*

*Other reviewers may be noted on record sheets kept with the original documentation.*

*This OSP is approved by: See Appendix C.*

## 10.0 Controlled Distribution List

*List the names and L-codes of personnel who must have or have requested a copy of the safety plan as determined by the Responsible Individual, facility management, ES&H Team or other individuals identified by the Authorizing Organization*